THE CONSTRUCTION WASTE MANAGEMENT FRAMEWORK FOR REDUCING ILLEGAL DUMPING ACTIVITIES IN THE CONSTRUCTION INDUSTRY

MOHD HILMI IZWAN BIN ABD RAHIM

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Universiti Tun Hussein Onn Malaysia

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DEDICATION

I dedicated this thesis to

Almighty **ALLAH SWT**

My Father (Abd Rahim bin Omar) & ***My Mother (Siti Zaharah binti Kadri)***

My Entire Family Member

and

Associate Professor Ts. Dr. Narimah Kasim

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ABSTRACT

Nowadays, an increasing number of construction projects in Malaysia have contributed to the production of construction waste. Additionally, the production of construction waste from construction projects has had a negative impact on the environment, especially through illegal dumping activities. To date, comprehensive criteria for construction waste management in developing countries have not been clearly defined. Therefore, further research needs to be done on construction waste management in Malaysia. The main objective of this research is to develop the construction waste management framework for reducing illegal dumping activities. Semi-structured interviews were conducted with 25 stakeholders from government, private sector, construction players and cleaning contractor. Furthermore, data's from the semi-structured interviews were analysed via content analysis using NVivo 10. The interviews finding were been transcribe to the Microsoft Word and analyse using Nvivo Software to figure out the significant theme and sub theme related to research objectives. Significant findings were used as potential improvements in the research to reduce illegal dumping activities. Hence, finding from this research has highlighted that currently there are lack implementation of proper construction waste management. Additionally, new findings found that awareness, enforcement, guidelines, cost, training and development, and technology are the most significant elements can be implemented in propose framework. The elements in the framework were divided into actions which need to be undertaken by construction players and those which require government enforcement. Finally, the proposed framework was evaluated by experts from the construction industry to obtain feedback. In conclusion, proposed framework will help stakeholders to identify strategies to reduce illegal dumping activities, increase awareness and seek better solutions for construction waste management in the construction industry.

ABSTRAK

Pada masa kini, peningkatan projek pembinaan di Malaysia telah menyumbang kepada penjanaan sisa pembinaan. Tambahan itu, penjanaan sisa pepejal pembinan telah menyumbang kepada kesan yang negative terhadap persekitaran, terutamanya melalui aktiviti pembuagan sisa pepejal secara haram. Sehingga kini, kriteria yang komprehensif untuk pengurusan sisa pembinaan di negara-negara membangun belum diselia sepenuhnya. Oleh itu, kajian perlu dilakukan terhadap pengurusan sisa pembinaan di Malaysia. Matlamat utama kajian ini adalah untuk membangunkan rangka kerja pengurusan sisa pepejal pembinaan bagi mengurangkan aktiviti pembuagan sisa pepejal secara haram. Temubual berbentuk semi-struktur telah dilakukan bersama 25 pihak berkepentingan dalam pengurusan sisa pepejal pembinaan dikalangan agensi kerajaan, agensi swasta, pemain pembinaan dan kontraktor pembersihan.Seterusnya data daripada temubual semi-stuktur dianalisis melalui analisis kandungan dengan menggunakan *NVivo 10*. Hasil dapatan kajian melalui temubual ditranskrip kepada perisian *Microsoft Word* dan dianalisis menggunakan perisian *Nvivo10* untuk memperolehi signifikan tema dan sub tema berkaitan dengan objektif kajian. Signifikasi dapatan kajian digunakan untuk penambahbaikan untuk mengurangkan aktiviti pembuangan sisa secara haram. Oleh yang demikian, hasil daripada kajian menunjukkan kekurangan terhadap pengaplikasian pengurusan sisa pepejal pembinaan. Tambahan itu, hasil kajian terbaru menunjukkan bahawa pematuhan, penguatkuasaan, garis panduan, kos, latihan dan pembangunan, dan teknologi adalah signifikan elemen yang boleh diimplimentasikan terhadap rangka kerja kajian yang dicadangkan. Elemen di dalam rangka kerja adalah terbahagi kepada dua iaitu tindakan yang perlu dilakukan oleh pemain pembinaan dan keperluan penguatkuasaan dari pihak kerajaan. Akhirnya, rangka kerja yang dicadangkan dinilai oleh pakar dari industri pembinaan untuk mendapatkan maklum balas. Kesimpulannya, rangka kerja yang dicadangkan akan membantu pihak berkepentingan untuk mengenal pasti strategi bagi mengurangkan aktiviti pembuangan sisa pepjal haram, meningkatkan kesedaran dan mencari penyelesaian yang lebih baik bagi pengurusan sisa pepejal dalam industri pembinaan.

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LIST OF ABBREVIATIONS

SWCorp	-	Solid Waste Corporation
C&D	-	Construction & Demolition
SWMP	-	Solid Waste Management Plans
GHG	-	Green House Gas
BCA	-	Building Construction Authority
SGP	-	Singapore Green Plan
UK	-	United Kingdom

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CHAPTER 1

INTRODUCTION

1.1 Preamble

This chapter presents an introduction to the research area and the overall content of this thesis. It starts with a discussion about the research background and the problem statement. This is followed by a review of the research questions, aims and objectives, research scope, research methodology and significance of the research. Finally, the structure of the thesis is explained in the final section.

1.2 Background of Research

An important problem that adversely affects the environmental is the generation of construction waste. The inappropriate management of waste generated in construction sites can lead to the increase in construction waste being dumped at landfills and illegal dumping. Compared to other countries, the government has applied appropriate planning for waste management (Nagapan *et al*., 2012; Eusuf *et al*., 2012; Yahaya & Abidin., 2013; Ismam & Ismail, 2014). In the United Kingdom (UK), 220 million tonnes of construction and demolition waste were produced in 2010. In developed countries such as the United Kingdom, the combination of waste management regulations, economic instruments and voluntary agreements has been implemented by the government to reduce waste generation (Mega, 2010). On the other hand, it shows that the UK government is proactively involved in construction waste management (Abanda *et al*., 2010; Ismam & Ismail, 2014).

The Malaysian Solid Waste and Public Cleansing Management Act 2007 (Act 672) has mentioned one of the common methods for the disposal of construction waste in Malaysia is landfills (Nagapan *et al*., 2012). The overall process of construction waste management in the Malaysian construction industry starts from waste production at the construction site, followed by waste collection before it is directly dumped into landfills. There are no segregation processes at the construction site and construction waste landfills in Malaysia (SWCorp, 2015). Previous research has also highlighted that inappropriate construction waste management practices in Malaysia have led to the increasing number of illegal dumping activities (Nagapan *et al*., 2012; Ismam & Ismail, 2014).

Improper construction waste management has definitely contributed to the increase in illegal dumping. In the construction industry, 6% to 8% of the waste for residential buildings is made up of tiles, 4% to 20% of waste for commercial buildings is made up of mix concrete whereas 15% consists of timber or wood (SWCorp, 2015). According to the previous studies, the highest percentages of waste materials found in illegal dumping areas consist of wood, mix concrete, tiles and bricks (Nagapan *et al*., 2012; SWCorp, 2016). On the other hand, the increasing production of construction waste at construction sites has obviously contributed to illegal dumping activities. Consequently, efficient construction waste management for construction projects is needed (Poon *et al*., 2004; Yuan *et al*., 2012; SWCorp, 2015). This research focuses on improving construction waste management by reducing illegal dumping activities in the Malaysian construction industry. Thus, this research aims to develop methods to improve construction waste management in the construction industry.

1.3 Problem Statement

Construction waste management is an important function for improving waste management in construction projects. This is because inappropriate waste management can often affect the environment, economy and society. Construction projects require appropriate waste management in order to reduce the issues of construction waste

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